

## SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: DAWN GARRETT Examiner #: 76107 Date: 3/23/2005  
 Art Unit: 1774 Phone Number 2-1523 Serial Number: 10729,328  
 Mail Box and Bldg/Room Location: Remsen 10C 79 Results Format Preferred (circle) PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*  
 Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Organic Electroluminescent Devices  
 Inventors (please provide full names): JOSEPH DEATON, TUKARAM HATWAR,  
DENIS KONDAKOV, CHRISTOPHER BROWN  
 Earliest Priority Filing Date: 12/5/2003

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

*Please search formulas (1), (2), (3), and (4) attached*

*also search:*

*formula 7 shown in claim 25*

SCIENTIFIC REFERENCE BR  
 Sci & Tech Inf. Cntr

MAR 24 2005

Pat. & T.M. Office

*Thank you*

## STAFF USE ONLY

		Type of Search	Vendors and cost where applicable
Searcher: <u>204</u>	NA Sequence (#)	STN	<u>\$ 838.20</u>
Searcher Phone #:	AA Sequence (#)	Dialog	
Searcher Location:	Structure (#) <u>4</u>	Questel/Orbit	
Date Searcher Picked Up:	Bibliographic	Dr. Link	
Date Completed: <u>4/6/05</u>	Litigation	Lexis/Nexis	
Searcher Prep & Review Time: <u>30</u>	Fulltext	Sequence Systems	
Clerical Prep Time: <u>30</u>	Patent Family	WWW/Internet	
Online Time: <u>180</u>	Other	Other (specify)	



# ***STIC Search Report***

**EIC 1700**

**STIC Database Tracking Number: 148777**

**TO: Dawn Garrett  
Location: REM 10C79  
Art Unit : 1774  
April 6, 2005**

**Case Serial Number: 10/729328**

**From: Les Henderson  
Location: EIC 1700  
REM 4B28 / 4A30  
Phone: 571-272-2538**

**Leslie.henderson@uspto.gov**

## **Search Notes**

=> d his ful

(FILE 'HOME' ENTERED AT 10:41:26 ON 06 APR 2005)

FILE 'REGISTRY' ENTERED AT 10:41:43 ON 06 APR 2005

D SAV  
ACTIVATE GAR738/A

L1 SCR 1841  
L2 STR  
L3 4402 SEA SSS FUL L2 AND L1  
-----  
D QUE STAT L3

FILE 'LREGISTRY' ENTERED AT 10:42:52 ON 06 APR 2005

L4 STR L2

FILE 'REGISTRY' ENTERED AT 10:45:50 ON 06 APR 2005

L5 2 SEA SUB=L3 SSS SAM L4  
D SCAN  
D QUE STAT  
L6 6 SEA SUB=L3 SSS FUL L4  
D SCAN  
SAV L6 GAR328/A

FILE 'LREGISTRY' ENTERED AT 10:52:26 ON 06 APR 2005

L7 STR L4

FILE 'REGISTRY' ENTERED AT 10:55:43 ON 06 APR 2005

FILE 'LREGISTRY' ENTERED AT 10:57:46 ON 06 APR 2005

L8 STR L4

FILE 'REGISTRY' ENTERED AT 11:00:11 ON 06 APR 2005

L9 1 SEA SUB=L3 SSS SAM L8  
D SCAN  
D QUE STAT  
L10 5 SEA SUB=L3 SSS FUL L8  
D SCAN  
SAV L10 GAR328A/A

FILE 'HCAPLUS' ENTERED AT 11:03:42 ON 06 APR 2005

L11 5 SEA ABB=ON PLU=ON L6  
L12 4 SEA ABB=ON PLU=ON L10  
L13 5 SEA ABB=ON PLU=ON L11 OR L12

FILE 'REGISTRY' ENTERED AT 11:04:43 ON 06 APR 2005

E AZOFLUORENE/CN  
E AZAFLUORENE/CN  
L14 1 SEA ABB=ON PLU=ON AZAFLUORENE/CN  
D SCAN  
E C12H9N/MF  
D RSD  
D L14 FIDE  
L15 1 SEA ABB=ON PLU=ON 97485-90-0/RN  
D SCAN

FILE 'LREGISTRY' ENTERED AT 11:17:52 ON 06 APR 2005

L16 STR

FILE 'REGISTRY' ENTERED AT 11:19:02 ON 06 APR 2005  
L17 50 SEA SSS SAM L16  
D RSD  
L18 2428 SEA ABB=ON PLU=ON 1839.22.20/RID AND 7-8/NR AND 2-10/N  
SAVE L18 GAR328B/A

FILE 'LREGISTRY' ENTERED AT 12:40:06 ON 06 APR 2005  
L19 STR L16  
L20 STR L19

FILE 'REGISTRY' ENTERED AT 12:52:12 ON 06 APR 2005  
L21 18 SEA SUB=L18 SSS SAM (L19 OR L20)  
D SCAN  
D QUE STAT

FILE 'LREGISTRY' ENTERED AT 12:55:09 ON 06 APR 2005  
L22 STR L19

FILE 'REGISTRY' ENTERED AT 12:58:40 ON 06 APR 2005  
D QUE STAT L21  
D QUE STAT L20  
L23 2 SEA SUB=L18 SSS SAM (L20 OR L22)  
D SCAN  
D QUE STAT  
L24 92 SEA SUB=L18 SSS FUL (L20 OR L22)  
SAV L24 GAR328C/A

FILE 'LREGISTRY' ENTERED AT 13:02:26 ON 06 APR 2005  
D QUE STAT L22  
L25 STR L22

FILE 'REGISTRY' ENTERED AT 13:03:53 ON 06 APR 2005  
L26 2 SEA SUB=L18 SSS SAM (L25 OR L20)  
D SCAN  
L27 90 SEA SUB=L18 SSS FUL (L25 OR L20)  
D QUE STAT

FILE 'HCA' ENTERED AT 13:05:59 ON 06 APR 2005

FILE 'HCAPLUS' ENTERED AT 13:06:22 ON 06 APR 2005  
D SCAN L13  
L28 427 SEA ABB=ON PLU=ON L27  
L29 2 SEA ABB=ON PLU=ON L13 AND L28  
D SCAN  
L30 134186 SEA ABB=ON PLU=ON EL OR E(W)L OR L(W)E(W)D OR OLED OR  
ELECTROLUM!N? OR ORGANOLUM!N? OR (ELECTRO OR ORGANO OR  
ORG#) (2A) LUM!N? OR LIGHT? (2A) (EMIT? OR EMISSION? OR  
SOURCE?)  
L31 665574 SEA ABB=ON PLU=ON (LUMINES##### OR FLUORES? OR  
PHOSPHORES?)/BI,AB OR LED/IT OR PHOSPHOR# OR LUMIN?  
L32 394 SEA ABB=ON PLU=ON L28 AND (L30 OR L31)  
E HOST/CT  
E HOSTS/CT  
E SUBSTRATE/CT  
E SUBSTRATES/CT  
E E3+ALL  
E HOSTS/IT

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E E3+ALL
E HOSTS/CV
E HOST/CV
L33      193016 SEA ABB=ON  PLU=ON  HOST#
L34      139 SEA ABB=ON  PLU=ON  L32 AND L33
          D QUE
L35      QUE ABB=ON  PLU=ON  LAMEL? OR LAMIN? OR MULTILAYER? OR
          MULTICOAT? OR MULTIFIILM?
L36      QUE ABB=ON  PLU=ON  (MULTI OR MULTIPL? OR PLURAL? OR
          THREE OR MANY OR NUMEROUS? OR SEVERAL? OR FEW OR
          MULTIFOLD? OR MANIFOLD? OR MULTITUD?) (2A) (LAYER? OR
          COAT? OR FILM?)
L37      QUE ABB=ON  PLU=ON  THREEPLY? OR THREEPLIES OR THREEPLIED
          OR (THREE OR 3) (2A) (PLY OR PLIES OR PLIED OR PLYING#)
L38      8 SEA ABB=ON  PLU=ON  L34 AND ((L35 OR L36 OR L37))
L39      37826 SEA ABB=ON  PLU=ON  IRIIDIUM# OR IR(A)METAL#
L40      70 SEA ABB=ON  PLU=ON  L39 AND L34
L41      6 SEA ABB=ON  PLU=ON  L39 AND L38
L42      13 SEA ABB=ON  PLU=ON  L13 OR L29 OR L38 OR L41
L43      11 SEA ABB=ON  PLU=ON  L42 NOT L29
          D QUE STAT

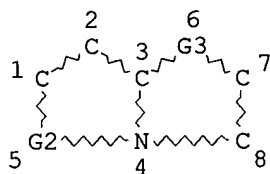
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=> => d que stat l29

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L1      SCR 1841
L2      STR

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VAR G2=IR/RH/RU/OS/PT/PD

REP G3=(1-2) C

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DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

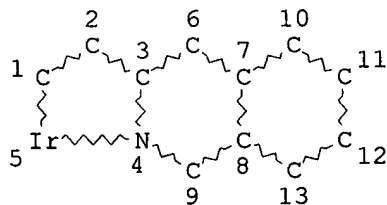
RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 8

STEREO ATTRIBUTES: NONE

L3 4402 SEA FILE=REGISTRY SSS FUL L2 AND L1

L4 STR



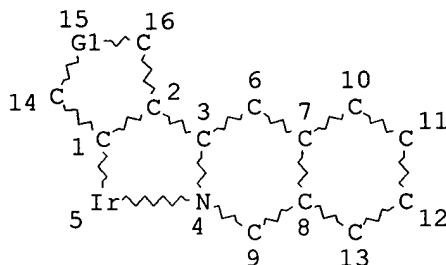
NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 13

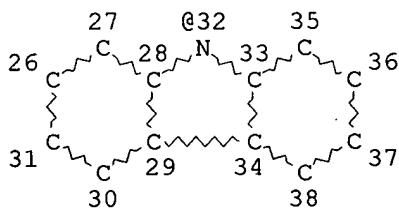
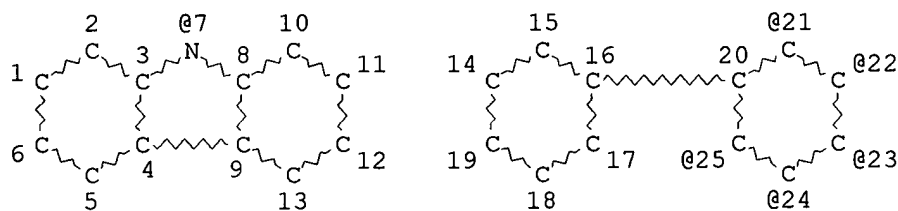
STEREO ATTRIBUTES: NONE  
L6 6 SEA FILE=REGISTRY SUB=L3 SSS FUL L4  
L8 STR



REP G1=(1-2) C  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 16

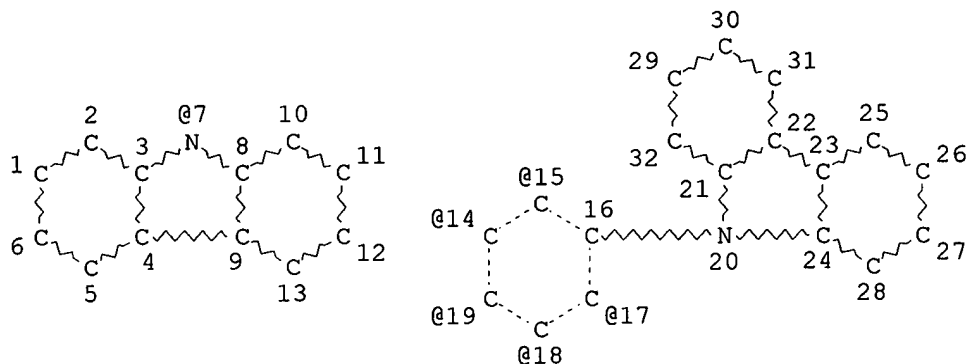
STEREO ATTRIBUTES: NONE  
L10 5 SEA FILE=REGISTRY SUB=L3 SSS FUL L8  
L11 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L6  
L12 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L10  
L13 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L11 OR L12  
L18 2428 SEA FILE=REGISTRY ABB=ON PLU=ON 1839.22.20/RID AND  
7-8/NR AND 2-10/N  
L20 STR



VPA 7-14/15/17/18/19 U  
VPA 32-21/22/23/24/25 U  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 38

STEREO ATTRIBUTES: NONE  
L25 STR



VPA 7-14/15/17/18/19 U  
NODE ATTRIBUTES:  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 32

STEREO ATTRIBUTES: NONE  
L27 90 SEA FILE=REGISTRY SUB=L18 SSS FUL (L25 OR L20)  
L28 427 SEA FILE=HCAPLUS ABB=ON PLU=ON L27  
L29 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 AND L28

=> d l29 1-2 ibib abs hitstr hitind

L29 ANSWER 1 OF 2 HCAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2003:710952 HCAPLUS  
DOCUMENT NUMBER: 139:237475  
TITLE: Iridium complexes as electroluminescent materials and their devices showing high light-emitting efficiency  
INVENTOR(S): Hamada, Yuji; Matsusue, Akimasa; Nishimura, Kazuki  
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003253256	A2	20030910	JP 2002-51802	200202

JP 3605083 B2 20041222  
US 2003194580 A1 20031016 US 2003-376099

27

200302  
26

PRIORITY APPLN. INFO.:

JP 2002-51802

A

200202  
27

OTHER SOURCE(S): MARPAT 139:237475  
GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB Electroluminescent materials having Markush structures of I, II, III, IV, (R1-6 = H, CnH2n+1, N(CnH2n+1)2, COOCnH2n+1, F, Cl, Br, I, CN, (un)substituted Ph or naphthyl; n = integer of 1-10; D = V, VI) and their benzo derivs. are claimed. Electroluminescent devices comprising layers of the said materials are also claimed. The devices show high emission efficiency and are suitable for use in mobile devices operated under low voltage.

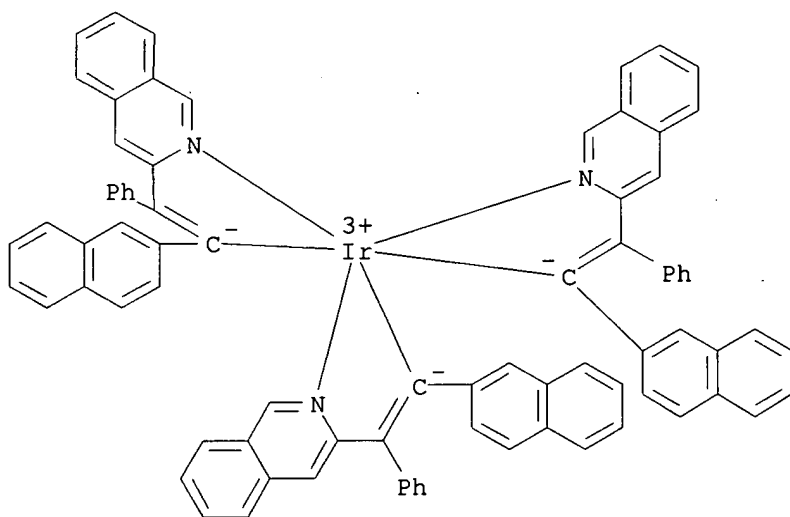
IT 594819-55-3

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(dopant; Ir complexes as dopants in electroluminescent devices for high light-emitting efficiency under low-voltage operation)

RN 594819-55-3 HCAPLUS

CN Iridium, tris[2-(3-isoquinolinyl-κN)-1-(2-naphthalenyl)-2-phenylethenyl-κC]- (9CI) (CA INDEX NAME)



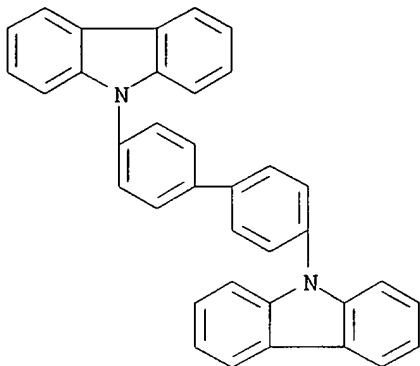
IT 58328-31-7

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(host; Ir complexes as dopants in electroluminescent devices for high light-emitting efficiency under low-voltage operation)



RN 58328-31-7 HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



IC ICM C09K011-06  
ICS C07F015-00; H05B033-14  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 25, 27, 29  
IT 594819-47-3 594819-48-4 594819-49-5 594819-50-8 594819-51-9  
594819-52-0 594819-53-1 594819-54-2 **594819-55-3**  
594819-56-4 594819-57-5 594819-58-6 594819-59-7 594819-60-0  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(dopant; Ir complexes as dopants in electroluminescent devices for high light-emitting efficiency under low-voltage operation)  
IT 16756-03-9 **58328-31-7** 139092-78-7 160780-82-5  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(host; Ir complexes as dopants in electroluminescent devices for high light-emitting efficiency under low-voltage operation)

L29 ANSWER 2 OF 2 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2001:788043 HCAPLUS

DOCUMENT NUMBER: 136:60584

TITLE: New iridium derivatives with good electrophosphorescence properties

AUTHOR(S): Liu, Man Wah; Wong, Oi Yan; Xie, Hong Zhi; Wong, Tsz Cheung; Mi, Bao Xiu; Wong, Fu Lung; Chan, Wai Lim; Lee, Chun Sing; Hung, Liang Sun; Tong Lee, Shuit

CORPORATE SOURCE: Center of Super-Diamond and Advanced Films (COSDAF) & Department of Physics and Materials Science, City University of Hong Kong, Hong Kong  
SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2001), 4416(Optical Engineering for Sensing and Nanotechnology (ICOSN 2001)), 466-469

CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

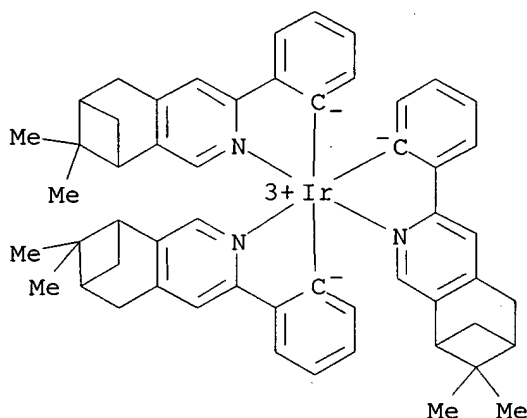
AB The authors synthesize a new Ir complex by introducing sterically bulky spacers into the framework of fac-[Ir(ppy)3] (ppy = 2-phenylpyridine). The main purpose is to reduce concentration quenching in Ir(ppy)3. The new complex exhibits a high (0.71) luminescence (PL) quantum yield in solution. The devices fabricated with the new Ir complex as an emitting dopant confirm that concentration quenching is almost negligible even at relatively high doping concns. For example, at a c.d. of 100 mA/cm<sup>2</sup>, the current efficiency for the devices with 7 and 26% dopants are 8.9 and 10.2 cd/A resp. These characteristics can be explained by a better energy transfer between the host and dopants upon introducing the sterically hindered spacers into the phosphorescent dyes.

IT 376385-24-9

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(electrophosphorescent device using)

RN 376385-24-9 HCAPLUS

CN Iridium, tris[2-[(6R,8R)-5,6,7,8-tetrahydro-7,7-dimethyl-6,8-methanoisoquinolin-3-yl-κN]phenyl-κC]-, (OC-6-22)- (9CI)  
(CA INDEX NAME)

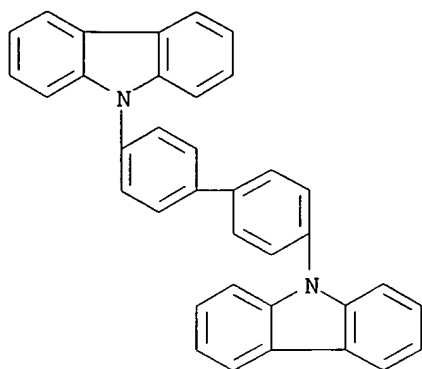


IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)  
(electrophosphorescent device using iridium phenylpyridine derivative complex with sterically bulky spacers and)

RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT **376385-24-9**

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses) (electrophosphorescent device using)

IT 2085-33-8, Tris(8-hydroxyquinolino)aluminum 4733-39-5, Bathocuproine **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl 123847-85-8, NPB

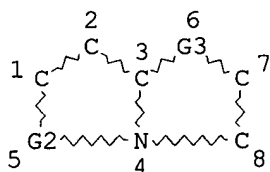
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses) (electrophosphorescent device using iridium phenylpyridine derivative complex with sterically bulky spacers and)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d que stat 143

L1 SCR 1841

L2 STR



VAR G2=IR/RH/RU/OS/PT/PD

REP G3=(1-2) C

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

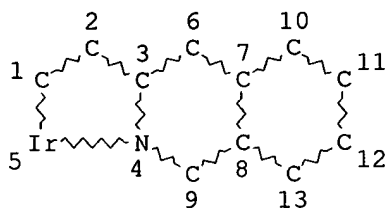
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NUMBER OF NODES IS 8

STEREO ATTRIBUTES: NONE

L3 4402 SEA FILE=REGISTRY SSS FUL L2 AND L1

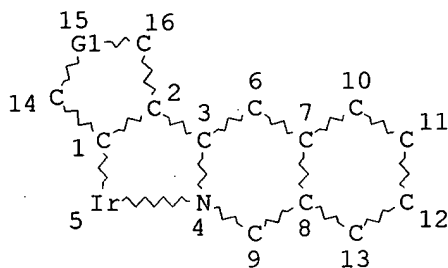
L4 STR



NODE ATTRIBUTES:  
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 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
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 NUMBER OF NODES IS 13

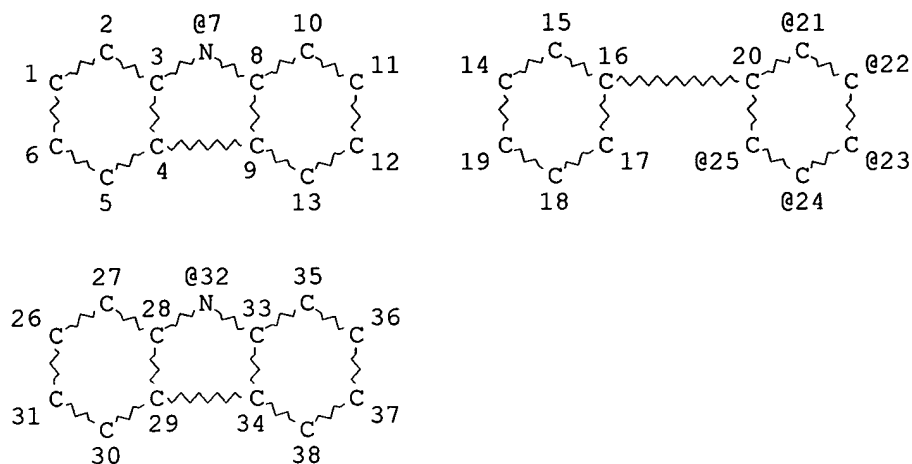
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 L8 STR



REP G1=(1-2) C  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 16

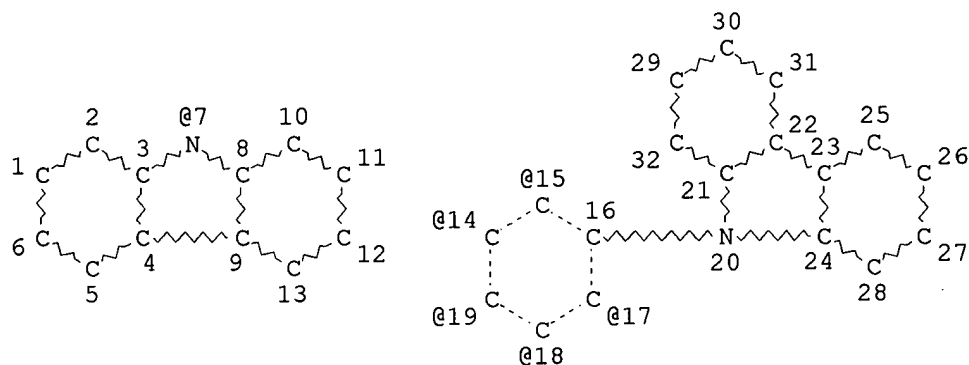
STEREO ATTRIBUTES: NONE  
 L10 5 SEA FILE=REGISTRY SUB=L3 SSS FUL L8  
 L11 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L6  
 L12 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L10  
 L13 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L11 OR L12  
 L18 2428 SEA FILE=REGISTRY ABB=ON PLU=ON 1839.22.20/RID AND  
 7-8/NR AND 2-10/N  
 L20 STR



VPA 7-14/15/17/18/19 U  
 VPA 32-21/22/23/24/25 U  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 38

STEREO ATTRIBUTES: NONE  
 L25 STR



VPA 7-14/15/17/18/19 U  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 32

STEREO ATTRIBUTES: NONE  
 L27 90 SEA FILE=REGISTRY SUB=L18 SSS FUL (L25 OR L20)  
 L28 427 SEA FILE=HCAPLUS ABB=ON PLU=ON L27  
 L29 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 AND L28

L30 134186 SEA FILE=HCAPLUS ABB=ON PLU=ON EL OR E(W)L OR L(W)E(W)D  
OR OLED OR ELECTROLUM!N? OR ORGANOLUM!N? OR (ELECTRO OR  
ORGANO OR ORG#) (2A) LUM!N? OR LIGHT? (2A) (EMIT? OR  
EMISSION? OR SOURCE?)

L31 665574 SEA FILE=HCAPLUS ABB=ON PLU=ON (LUMINES##### OR  
FLUORES? OR PHOSPHORES?)/BI,AB OR LED/IT OR PHOSPHOR# OR  
LUMIN?

L32 394 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND (L30 OR L31)

L33 193016 SEA FILE=HCAPLUS ABB=ON PLU=ON HOST#

L34 139 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L33

L35 QUE ABB=ON PLU=ON LAMEL? OR LAMIN? OR MULTILAYER? OR M  
ULTICOAT? OR MULTIFILM?

L36 QUE ABB=ON PLU=ON (MULTI OR MULTIPL? OR PLURAL? OR THR  
EE OR MANY OR NUMEROUS? OR SEVERAL? OR FEW OR MULTIFOLD?  
OR MANIFOLD? OR MULTITUD?) (2A) (LAYER? OR COAT? OR FILM?)

L37 QUE ABB=ON PLU=ON THREEPLY? OR THREEPLIES OR THREEPLIE  
D OR (THREE OR 3) (2A) (PLY OR PLIES OR PLIED OR PLYING#)

L38 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L34 AND ((L35 OR L36 OR  
L37))

L39 37826 SEA FILE=HCAPLUS ABB=ON PLU=ON IRIDIUM# OR IR(A)METAL#

L41 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L39 AND L38

L42 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 OR L29 OR L38 OR  
L41

L43 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L42 NOT L29

=> d l43 1-11 ibib abs hitstr hitind

L43 ANSWER 1 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2004:553509 HCAPLUS

DOCUMENT NUMBER: 141:260859

TITLE: Diastereoselective Formation of Chiral  
Tris-Cyclometalated Iridium (III) Complexes:  
Characterization and Photophysical Properties

AUTHOR(S): Schaffner-Hamann, Christine; von Zelewsky,  
Alexander; Barbieri, Andrea; Barigelletti,  
Francesco; Muller, Gilles; Riehl, James P.;  
Neels, Antonia

CORPORATE SOURCE: Department of Chemistry, University of Fribourg,  
Fribourg, CH-1700, Switz.

SOURCE: Journal of the American Chemical Society (2004),  
126(30), 9339-9348  
CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Chiral, facial tris-cyclometalated Ir(III) complexes,  
fac- $\Delta$ -Ir(pppy)<sub>3</sub>, fac- $\Lambda$ -Ir(pppy)<sub>3</sub>, fac- $\Lambda$ -IrL  
(where pppy is (8R,10R)-2-(2'-phenyl)-4,5-pinenopyridine and L is a  
tripodal ligand comprising three pppy moieties connected through a  
mesityl spacer) have been synthesized and characterized. In IrL,  
NMR and CD studies indicate that only one diastereomer is formed,  
with the  $\Lambda$  configuration at the metal center, whereas  
enantiopure pppy yields the fac- $\Lambda$ - and the  
fac- $\Delta$ -stereoisomers in a ratio of 2:3. Fac- $\Lambda$ -IrL was  
structurally characterized using x-ray crystallog. The luminescence  
properties, including CPL, of the three complexes and their  
sensitivity to dioxygen were examined

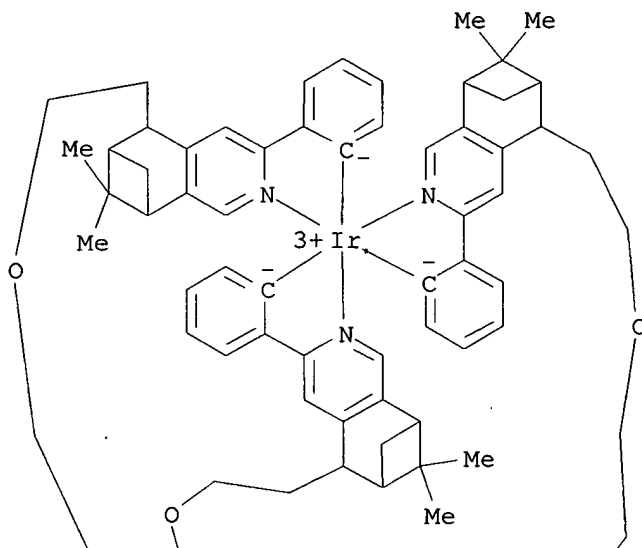
IT 749250-93-9P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)(crystal structure; diastereoselective formation and photophys.  
property of mesityl spacer containing chiral tris-cyclometalated  
iridium pinenopyridine complexes)

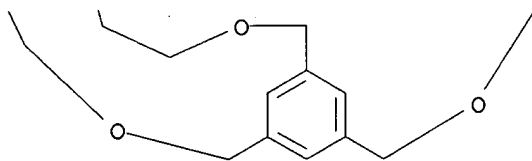
RN 749250-93-9 HCAPLUS

CN Iridium, [1,3,5-benzenetriyltris[methyleneoxy-2,1-ethanediyl-2,1-  
ethanediyl[(5S,6R,8R)-5,6,7,8-tetrahydro-7,7-dimethyl-6,8-  
methanoisoquinolin-5,3-diyl-κN2]-2,1-phenylene-κC]]-,  
(OC-6-22-A)- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



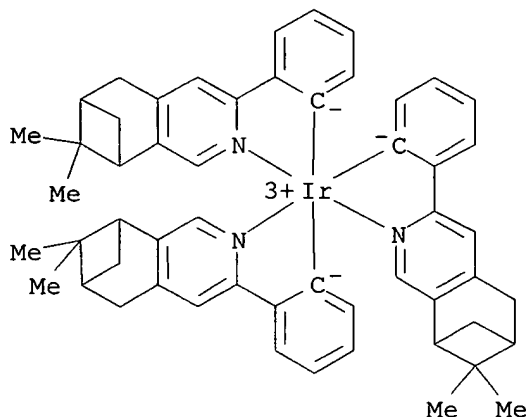
IT 749862-60-0P 749862-62-2P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)(diastereoselective formation and photophys. property of mesityl  
spacer containing chiral tris-cyclometalated iridium pinenopyridine  
complexes)

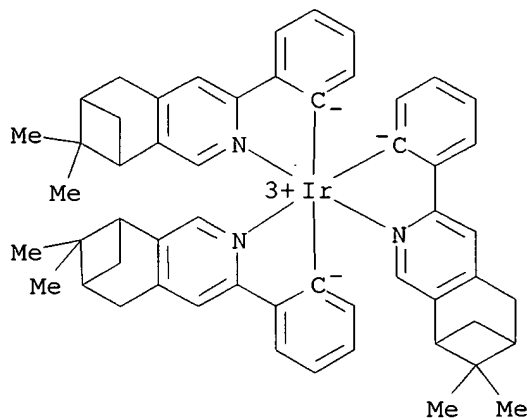
RN 749862-60-0 HCAPLUS

CN Iridium, tris[2-[(6R,8R)-5,6,7,8-tetrahydro-7,7-dimethyl-6,8-

methanoisoquinolin-3-yl- $\kappa$ N]phenyl- $\kappa$ C]-,  
(OC-6-21- $\Delta$ )- (9CI) (CA INDEX NAME)



RN 749862-62-2 HCAPLUS  
CN Iridium, tris[2-[(6R,8R)-5,6,7,8-tetrahydro-7,7-dimethyl-6,8-methanoisoquinolin-3-yl- $\kappa$ N]phenyl- $\kappa$ C]-,  
(OC-6-21- $\Delta$ )- (9CI) (CA INDEX NAME)



CC 29-13 (Organometallic and Organometalloidal Compounds)  
Section cross-reference(s): 72, 73, 75

IT **749250-93-9P**

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(crystal structure; diastereoselective formation and photophys.  
property of mesityl spacer containing chiral tris-cyclometalated  
iridium pinenopyridine complexes)

IT **749862-60-0P 749862-62-2P**

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(diastereoselective formation and photophys. property of mesityl  
spacer containing chiral tris-cyclometalated iridium pinenopyridine  
complexes)

REFERENCE COUNT: 65 THERE ARE 65 CITED REFERENCES AVAILABLE



FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

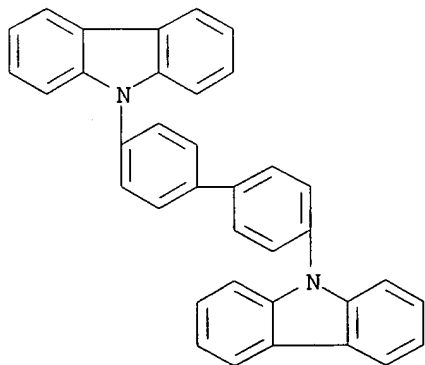
L43 ANSWER 2 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2003:773840 HCAPLUS  
DOCUMENT NUMBER: 139:298982  
TITLE: **Electroluminescent** device with carrier  
transport layer  
INVENTOR(S): Ide, Nobuhiro; Kido, Junji; Tsubaki, Kenji;  
Kondo, Yukihiro; Kishiue, Yasuhisa; Kono, Kenji  
PATENT ASSIGNEE(S): Matsushita Electric Works, Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003282267	A2	20031003	JP 2002-81856	200203 22
PRIORITY APPLN. INFO.: JP 2002-81856				200203 22

AB The invention refers to an **electroluminescent** device comprising an **organic luminescent** layer between an anode and a cathode, wherein the **organic luminescent** layer contains 20 - 99.9% mol. of an organic compound which provides **luminescence** and a carrier transport aiding agent having a energy gap larger than that of the organic compound in order to minimize the **luminescence** fluctuation and to eliminate the need for guest-host doping and ultra thin film **laminates**.

IT **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl  
RL: DEV (Device component use); USES (Uses)  
(**electroluminescent** device with carrier transport layer)

RN 58328-31-7 HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)

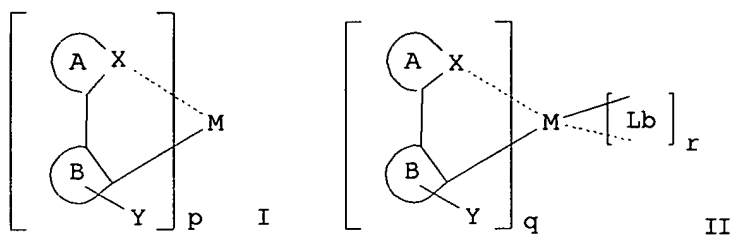


IC ICM H05B033-14  
ICS H05B033-22  
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
ST **electroluminescent** device carrier transport  
IT **Electroluminescent** devices  
(**electroluminescent** device with carrier transport layer)  
IT Electric current carriers  
(transport; **electroluminescent** device with carrier transport layer)  
IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 4733-39-5, Bathocuproin **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl 144810-07-1  
RL: DEV (Device component use); USES (Uses)  
(**electroluminescent** device with carrier transport layer)

L43 ANSWER 3 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2003:155115 HCAPLUS  
DOCUMENT NUMBER: 138:212530  
TITLE: Luminescent organometallic compound and light emitting device  
INVENTOR(S): Fujii, Hiroyuki  
PATENT ASSIGNEE(S): Japan  
SOURCE: U.S. Pat. Appl. Publ., 15 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	
US 2003040627	A1	20030227	US 2002-170396	20020614
JP 2004059433	A2	20040226	JP 2002-172832	20020613
CN 1397559	A	20030219	CN 2002-124374	20020617
PRIORITY APPLN. INFO.:			JP 2001-182507	A 20010615
			JP 2002-165353	A 20020606

OTHER SOURCE(S): MARPAT 138:212530  
GI



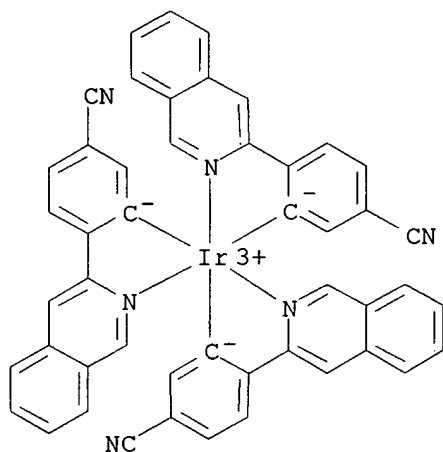
AB Luminescent organometallic compds. are described by the general formulas I and II (A and B represent ring structures, M = a metal atom; X = a hetero atom other than C or H; Y =  $\geq 1$  electron-attracting group connecting to ring structure B; Lb = a unidentate or multidentate ligand; and p, q and r = pos. integers). Light-emitting devices with emitting layers incorporating the compds. are also described.

IT **500295-42-1**

RL: DEV (Device component use); USES (Uses)  
(luminescent organometallic compds. with heteroaryl derivative ligands and light-emitting devices using them)

RN 500295-42-1 HCAPLUS

CN Iridium, tris[2-(3-isoquinoliny- $\kappa$ N)-5-cyanophenyl- $\kappa$ C]-  
(9CI) (CA INDEX NAME)



IC ICM C07F009-6568

NCL 546002000; 548402000; 549003000; 556013000

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 29, 76

IT 7440-04-2D, Osmium, compds. with heteroaryl derivs. 405890-11-1  
 405927-91-5 500295-35-2 500295-36-3 500295-37-4 500295-38-5  
 500295-39-6 500295-40-9 500295-41-0 **500295-42-1**  
 500295-43-2 500295-44-3 500295-45-4 500295-46-5 500295-48-7  
 500295-49-8 500295-50-1 500295-51-2 500295-52-3 500295-53-4  
 500295-54-5 500295-55-6 500295-56-7 500295-57-8 500295-58-9  
 500295-59-0 500295-60-3 500295-61-4 500295-62-5 500295-63-6  
 500295-64-7

RL: DEV (Device component use); USES (Uses)  
(luminescent organometallic compds. with heteroaryl derivative  
ligands and light-emitting devices using them)

L43 ANSWER 4 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2002:754786 HCAPLUS

DOCUMENT NUMBER: 137:270943

TITLE: Deposition apparatus and method for manufacturing an  
**organic luminescent** element which  
requires a lower drive voltage and has a longer  
life

INVENTOR(S): Yamazaki, Shunpei; Seo, Satoshi; Mizukami,  
Mayumi

PATENT ASSIGNEE(S): Japan

SOURCE: U.S. Pat. Appl. Publ., 42 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
US 2002139303	A1	20021003	US 2002-62005	200201 31
CN 1369573	A	20020918	CN 2002-103325	200201 31
JP 2002302757	A2	20021018	JP 2002-22741	200201 31
TW 552650	B	20030911	TW 2002-91101696	200201 31
PRIORITY APPLN. INFO.:			JP 2001-26184	A 200102 01

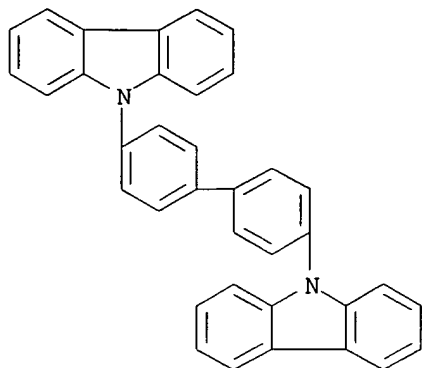
AB A deposition apparatus is provided for manufacturing an organic compound  
**layer** having a **plurality** of function regions. The  
deposition apparatus includes a plurality of evaporation sources within a  
deposition chamber, for enabling continuous formation of resp.  
function regions comprised of organic compds. and, further, formation  
of a mixed region at an interface between adjacent ones of the  
function regions. With the deposition apparatus having such fabrication  
chamber, it is possible to prevent impurity contamination between  
the functions regions and further possible to form an organic compound  
layer with an energy gap relaxed at the interface.

IT 58328-31-7

RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
(Physical, engineering or chemical process); PYP (Physical process);  
FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(**host**; deposition apparatus and method for manufacturing  
**luminescent** element having plurality of function regions)

RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
NAME)



IC ICM C23C016-00  
ICS B05D005-06  
NCL 118719000  
CC 75-1 (Crystallography and Liquid Crystals)  
Section cross-reference(s): 74  
ST org compd layer vacuum evapn deposition **luminescent** device  
IT **Luminescent** substances  
(deposition apparatus and method for manufacturing **luminescent** element having plurality of function regions)  
IT Amines, processes  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(diamines, aromatic, hole transportability; deposition apparatus and method for manufacturing **luminescent** element having plurality of function regions)  
IT **Electroluminescent** devices  
(thin-film; deposition apparatus and method for manufacturing **luminescent** element having plurality of function regions)  
IT Vapor deposition apparatus  
Vapor deposition process  
(vacuum; deposition apparatus and method for manufacturing **luminescent** element having plurality of function regions)  
IT 4733-39-5, Bathocuproin  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(blocking ability; deposition apparatus and method for manufacturing **luminescent** element having plurality of function regions)  
IT 12798-95-7, Aluminum alloy, Al, Li  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(conductive film; deposition apparatus and method for manufacturing **luminescent** element having plurality of function regions)  
IT 91-22-5D, Quinoline, derivs., complexes 2085-33-8, Tris(8-quinolinolato) aluminum 11120-54-0D, Oxadiazole, derivs., complexes 12678-01-2D, Phenanthroline, derivs., complexes 37306-44-8D, Triazole, derivs., complexes 39327-16-7D, Benzoquinoline, derivs., complexes  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process);

FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(electron transportability; deposition apparatus and method for  
manufacturing **luminescent** element having plurality of  
function regions)

IT 147-14-8, Copper phthalocyanine 123847-85-8, 4,4'-Bis  
[N-(1-naphthyl)-N-phenylamino]biphenyl 124729-98-2, MTDATA  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
(Physical, engineering or chemical process); PYP (Physical process);  
FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(hole transportability; deposition apparatus and method for manufacturing  
**luminescent** element having plurality of function regions)

IT 58328-31-7  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
(Physical, engineering or chemical process); PYP (Physical process);  
FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(**host**; deposition apparatus and method for manufacturing  
**luminescent** element having plurality of function regions)

IT 95-16-9D, Benzothiazole, derivs., complexes 273-53-0D,  
Benzoxazole, derivs., complexes 31248-39-2, 2,3,7,8,12,13,17,18-Oc-  
taethyl-21H,23H-porphyrin-platinum 94928-86-6, Tris  
(2-phenylpyridine)**iridium**  
RL: DEV (Device component use); FMU (Formation, unclassified); PEP  
(Physical, engineering or chemical process); PYP (Physical process);  
FORM (Formation, nonpreparative); PROC (Process); USES (Uses)  
(**luminescent** ability; deposition apparatus and method for  
manufacturing **luminescent** element having plurality of  
function regions)

L43 ANSWER 5 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2002:719427 HCAPLUS

DOCUMENT NUMBER: 138:63510

TITLE: **Light-emitting** diodes based  
on **phosphorescent** guest/polymeric  
**host** systems

AUTHOR(S): Vaeth, Kathleen M.; Tang, C. W.

CORPORATE SOURCE: Research and Development, and Electronic Imaging  
Products, Research and Development, Imaging  
Materials and Media, Eastman Kodak Company,  
Rochester, NY, 14650, USA

SOURCE: Journal of Applied Physics (2002), 92(7),  
3447-3453

CODEN: JAPIAU; ISSN: 0021-8979

PUBLISHER: American Institute of Physics

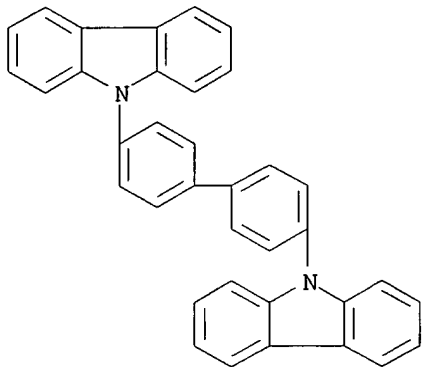
DOCUMENT TYPE: Journal

LANGUAGE: English

AB Fabrication of polymer **light-emitting** diodes  
based on emission from the **phosphorescent** mol. fac  
tris(2-phenylpyridine) Ir doped into a poly(vinyl carbazole)  
**host** are reported. **Several spin-coating**  
solvents were evaluated for deposition of the polymer layer; toluene  
and chlorobenzene consistently produce device-quality films with  
sufficient incorporation of the dopant. For single-layered devices  
with Mg0.9Ag0.1 cathodes, the **luminance** efficiency at 20  
mA/cm<sup>2</sup> is 8.7 Cd/A for devices processed from chlorobenzene. This  
efficiency could be increased by over a factor of two with a  
tri-layered device geometry consisting of the doped polymer layer, a  
hole-blocking layer, and electron transport layer. Further  
increases in efficiency, up to 30 Cd/A and 8.5% external quantum  
efficiency, were observed when a 2nd dopant of 2-(4-biphenyl)yl-5-(4-

tert-butylphenyl)-1,3,4-oxadiazole was added to the polymer emitter layer.

IT **58328-31-7**, CBP (dye)  
 RL: DEV (Device component use); USES (Uses)  
 (CBP; **light-emitting** diodes based on  
**phosphorescent** guest/polymeric **host** systems)  
 RN 58328-31-7 HCAPLUS  
 CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
 NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 ST **light emitting** diode LED **phosphorescent**  
 guest polymeric **host**  
 IT **Electroluminescent** devices  
 Luminescence  
 Luminescence, electroluminescence  
 (light-emitting diodes based on  
**phosphorescent** guest/polymeric **host** systems)  
 IT 122648-99-1  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (ADN; **light-emitting** diodes based on  
**phosphorescent** guest/polymeric **host** systems)  
 IT **58328-31-7**, CBP (dye)  
 RL: DEV (Device component use); USES (Uses)  
 (CBP; **light-emitting** diodes based on  
**phosphorescent** guest/polymeric **host** systems)  
 IT 182947-41-7, Magnesium 90, silver 10 (atomic)  
 RL: DEV (Device component use); USES (Uses)  
 (light-emitting diodes based on  
**phosphorescent** guest/polymeric **host** systems)  
 IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 15082-28-7,  
 2-(4-Biphenyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole  
 25067-59-8, Poly(vinyl carbazole) 80663-92-9 94928-86-6,  
 Tris(2-phenylpyridine)**iridium** 192198-85-9, TPBi  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (light-emitting diodes based on  
**phosphorescent** guest/polymeric **host** systems)  
 IT 108-88-3, Toluene, uses 108-90-7, Chlorobenzene, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (spin coating solvent; **light-emitting** diodes  
 based on **phosphorescent** guest/polymeric **host**  
 systems)

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L43 ANSWER 6 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2002:656369 HCAPLUS  
DOCUMENT NUMBER: 137:192553  
TITLE: Organic **electroluminescent** devices  
using thermoplastic substrates and their  
manufacture  
INVENTOR(S): Mishima, Masayuki  
PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

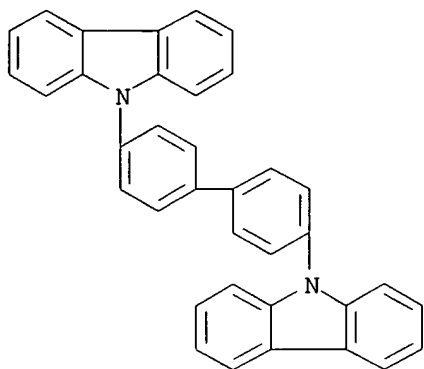
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	
JP 2002246172	A2	20020830	JP 2001-37501	200102 14
PRIORITY APPLN. INFO.: JP 2001-37501				200102 14

AB The organic **EL** device has a thermoplastic substrate having thereon transparent electrodes,  $\geq 1$  organic compound layers involving **luminescent** layers, back electrodes, and a thermoplastic sealing which seals the organic compound layer(s) and shields outside airs and is fused with the thermoplastic substrate around the periphery of the **luminescent laminate** to offer excellent brightness, **luminescent** efficiency and durability. The device is useful for full color displays, back **lights**, surface **light sources**, **light source** arrays for printers, etc.

IT **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**host** material; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)

RN **58328-31-7** HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)





- IC ICM H05B033-04  
ICS H05B033-02; H05B033-10; H05B033-14
- CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
- ST org **electroluminescent** device thermoplastic substrate durability; sealing thermoplastic substrate org **electroluminescent** device
- IT Fluoropolymers, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Nitoflon, substrate; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT Polycarbonates, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Panlite, substrate; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT Polyesters, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Tetoron Film, substrate; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT Sealing  
(manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT **Electroluminescent** devices  
(organic; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT Plastics, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(thermoplastics, substrates; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 117944-65-7, Indium zinc oxide  
RL: TEM (Technical or engineered material use); USES (Uses)  
(IZO, transparent electrode; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 7440-22-4, Silver, uses 12614-86-7  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Mg-Ag/Ag **laminate** back electrode; manufacture of organic

- EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 1312-43-2, Indium oxide (In<sub>2</sub>O<sub>3</sub>)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(Zn-doped In<sub>2</sub>O<sub>3</sub> transparent electrode; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 7440-66-6, Zinc, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(dopant, Zn-doped In<sub>2</sub>O<sub>3</sub> transparent electrode; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 358974-66-0, 2,2',2''-(1,3,5-Benzenetriyl)tris[3-(2-methylphenyl)-3H-imidazo[4,5-b]pyridine]  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electron transporting layer; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 15082-28-7, 2-(4-Biphenyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole  
123847-85-8  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electron-transporting material; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 155090-83-8, Baytron P  
RL: TEM (Technical or engineered material use); USES (Uses)  
(hole injection layer; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 25067-59-8, Poly(vinylcarbazole)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(hole transporting/**host** material; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**host** material; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)
- IT 94928-86-6, Tris(2-phenylpyridine)**iridium**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**phosphor**; manufacture of organic **EL** devices using thermoplastic substrates sealed with thermoplastic sealings for enhanced durability)

L43 ANSWER 7 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2002:575513 HCAPLUS

DOCUMENT NUMBER: 137:131918

TITLE: Organic **light emitting**  
element and display device using the element

INVENTOR(S): Seo, Satoshi; Yamazaki, Shunpei

PATENT ASSIGNEE(S): Japan

SOURCE: U.S. Pat. Appl. Publ., 49 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002101154	A1	20020801	US 2002-60427	20020129
TW 520614	B	20030211	TW 2002-91101688	20020131
JP 2002305085	A2	20021018	JP 2002-25701	20020201
CN 1378409	A	20021106	CN 2002-118312	20020201
PRIORITY APPLN. INFO.:			JP 2001-25971	A 20010201

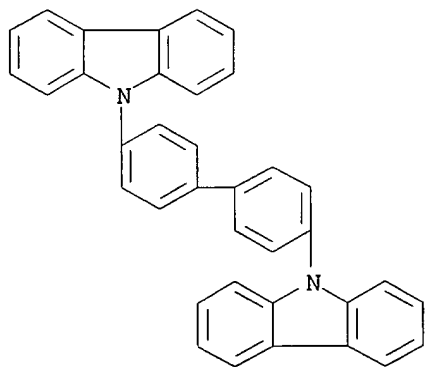
AB Organic **light-emitting** devices are described in which the organic layers include a mixed region (e.g., a layer in which both a hole-transporting material and electron-transporting material are mixed, a region in which a hole-transporting material and the **host** material for the **light-emitting** material are mixed, etc.). Interfaces between resp. layers which exist in a conventional **multilayered** structure are eliminated. Preferably, the **light-emitting** layer(s) include a red-emitting triplet material. Electronic equipment (organic **electroluminescent** displays, video cameras, digital cameras, image reproduction apparatus, portable computers, personal computers, mobile telephones, and acoustic equipment) employing the devices is also described.

IT **58328-31-7**

RL: DEV (Device component use); USES (Uses)  
(organic **light-emitting** devices with mixed organic layers and display devices using them)

RN 58328-31-7 HCAPLUS

CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



IC ICM H01J001-62

NCL 313506000

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related

Properties)  
Section cross-reference(s): 74, 76  
ST org **light emitting** device display mixed layer  
IT **Electroluminescent** devices  
(displays, organic; organic **light-emitting** devices  
with mixed organic layers and display devices using them)  
IT **Luminescent** screens  
(**electroluminescent, organic; organic light**  
**-emitting** devices with mixed organic layers and display  
devices using them)  
IT **Electroluminescent** devices  
(organic; organic **light-emitting** devices with mixed  
organic layers and display devices using them)  
IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-  
hydroxyquinolinato)aluminum 4733-39-5, Bathocuproin 7440-69-9,  
Bismuth, uses 12798-95-7 31248-39-2, 2,3,7,8,12,13,17,18-  
Octaethyl-21H,23H-porphyrinplatinum 50926-11-9, ITO 52934-06-2,  
Gallium zinc oxide **58328-31-7** 123847-85-8,  
4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 146162-54-1  
RL: DEV (Device component use); USES (Uses)  
(organic **light-emitting** devices with mixed organic  
layers and display devices using them)

L43 ANSWER 8 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2001:682100 HCAPLUS

DOCUMENT NUMBER: 136:12454

TITLE: Reduction of self-quenching effect in organic  
electrophorescence emitting devices via the use  
of sterically hindered spacers in  
phosphorescence molecules

AUTHOR(S): Xie, Hong Zhi; Liu, Man Wah; Wang, Oi Yan;  
Zhang, Xiao Hong; Lee, Chun Sing; Hung, Liang  
Sun; Lee, Shuit Tong; Teng, Pang Fei; Kwong, Hoi  
Lun; Zheng, Hui; Che, Chi Min

CORPORATE SOURCE: Center of Super-Diamond and Advanced Films and  
Department of Physics and Materials Science,  
City University of Hong Kong, Hong Kong, Peop.  
Rep. China

SOURCE: Advanced Materials (Weinheim, Germany) (2001),  
13(16), 1245-1248

CODEN: ADVMEW; ISSN: 0935-9648

PUBLISHER: Wiley-VCH Verlag GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The photoluminescence (PL) and electroluminescence (EL) properties  
of new Ir complex, Ir(mppy)<sub>3</sub>, prepared by introducing a pinene group  
as spacer on the framework of 2-phenylpyridine, were examined The  
identity of the product was carried out by 1H NMR. Mass spectral  
anal. showed a mol. ionic peak at a m/e ratio of 937.6 corresponding  
to Ir(mppy)<sub>3</sub><sup>+</sup> with fragments at a m/e ratio of 689.5 and 434.3,  
resp. corresponding to Ir(mpp)<sub>2</sub><sup>+</sup> and Irmp<sub>2</sub><sup>+</sup>. The absorption and PL  
spectra of Ir(mppy)<sub>3</sub> were measured in degassed MeOH solution in its  
solid state at room temperature, and in ice glass at 77 K. To study the  
EL properties, the new Ir compound was used as an emitting dopant for  
fabricating EL devices with various doping concns. In these  
devices, 4,4'-dicarbazolyl-1,1'-biphenyl (CBP) acted as a host  
material. N,N'-di-1-naphthyl-N,N'-diphenyl-biphenyl-4,4'-diamine  
and tris(8-hydroxyquinolato)aluminum(III) were used as  
hole-transport layer and an electron transport layer, resp.

Current-voltage characteristics of the Ir complex doped devices were measured and they were fairly insensitive to the doping concentration of Ir(mppy)3. The luminance-current studies revealed a gradual increase of brightness when the concentration of Ir(mppy)3 in CBP was increased. Ir(mppy)3 exhibited very strong green phosphorescence emission with a PL quantum yield of 0.71 in solution and a relative short lifetime of 0.33  $\mu$ s in solid. Self-quenching was significantly reduced for this compound in solution even at high concentration because the sterically hindered pinene spacer in the phosphor mol. led to min. bimol. interaction,. Bright green emission was observed from EL devices based on this Ir complex, and external quantum efficiency increased with increasing Ir(mppy)3 concentration, confirming that the aggregation quenching was almost negligible in these phosphorescence devices.

IT **376385-24-9P**

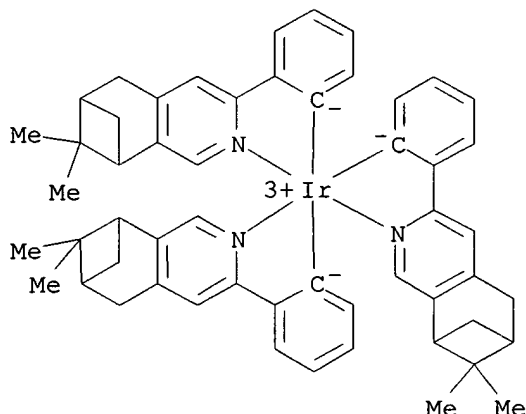
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation);

PREP (Preparation); RACT (Reactant or reagent)

(reduction of self-quenching effect in organic electrophorescence emitting devices via use of sterically hindered spacers in phosphorescence mols.)

RN 376385-24-9 HCAPLUS

CN Iridium, tris[2-[(6R,8R)-5,6,7,8-tetrahydro-7,7-dimethyl-6,8-methanoisoquinolin-3-yl- $\kappa$ N]phenyl- $\kappa$ C]-, (OC-6-22)- (9CI)  
(CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22, 25, 76

IT **376385-24-9P**

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation);

PREP (Preparation); RACT (Reactant or reagent)

(reduction of self-quenching effect in organic electrophorescence emitting devices via use of sterically hindered spacers in phosphorescence mols.)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L43 ANSWER 9 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2001:400133 HCAPLUS

DOCUMENT NUMBER: 135:202186

**TITLE:** Optimization of driving lifetime durability in organic LED devices using Ir complex

**AUTHOR(S):** Watanabe, Teruichi; Nakamura, Kenji; Kawami, Shin; Fukuda, Yoshinori; Tsuji, Taishi; Wakimoto, Takeo; Miyaguchi, Satoshi

**CORPORATE SOURCE:** Corporate R&D Laboratories, Pioneer Corporation, Tsurugashima, Saitama, 350-02, Japan

**SOURCE:** Proceedings of SPIE-The International Society for Optical Engineering (2001), 4105(Organic Light-Emitting Materials and Devices IV), 175-182  
CODEN: PSISDG; ISSN: 0277-786X

**PUBLISHER:** SPIE-The International Society for Optical Engineering

**DOCUMENT TYPE:** Journal

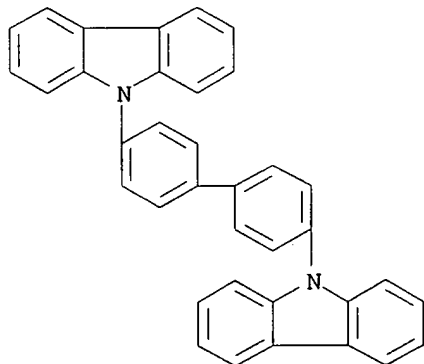
**LANGUAGE:** English

**AB** **Multilayer organic light-emitting device** with **phosphorescent** guest emitter, tris(2-phenylpyridine) **iridium** [Ir(ppy)<sub>3</sub>] doped in a **host** 4,4'-N,N'-dicarbazolylbiphenyl (CBP) layer, exhibited very high **luminous** efficiency. A device having such **phosphorescent** guest emitter could not offer sufficiently long driving lifetime required by real products. **Phosphorescence** in organic mols. rarely occurs at room temperature. Ways were studied to increase driving lifetime by 3 types of expts. Whether the driving lifetime is dependent on guest mol. concentration was studied. Cu phthalocyanine (CuPc) was inserted between In Sn Oxide (ITO) anode and hole transport layer, 4,4'-bis[N-(naphthyl)-N-phenylamino]biphenyl (NPB) to prevent driving voltage from rising during constant current operation. The hole blocking layer, which is 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline (BCP), was exchanged for [(1,1'-biphenyl)-4-olato]bis(2-methyl-8-quinolinolato-N1,O8)aluminum (BALq). Optimizing all of the above mentioned steps, the half decay lifetime of  $\geq 20,000$  h at an initial **luminance** of 100 cd/m<sup>2</sup> by constant current driving can be expected.

**IT** **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl  
**RL:** DEV (Device component use); USES (Uses)  
(optimization of driving lifetime durability in organic **LED** devices using **iridium** phenylpyridine complex in)

**RN** 58328-31-7 HCAPLUS

**CN** 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
Section cross-reference(s): 76

ST diode **light emitting iridium**  
phenylpyridine complex driving lifetime durability; LED  
**iridium** phenylpyridine complex driving lifetime durability  
optimization

IT **Luminescence, electroluminescence**  
**Phosphorescence**  
(of **organic LED** devices using **iridium**  
phenylpyridine complex)

IT **Electroluminescent** devices  
(optimization of driving lifetime durability using  
**iridium** phenylpyridine complex in)

IT 94928-86-6, Tris(2-phenylpyridine)**iridium**  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(optimization of driving lifetime durability in organic **LED**  
devices using)

IT 147-14-8, Copper phthalocyanine 4733-39-5, 2,9-Dimethyl-4,7-  
diphenyl-1,10-phenanthroline 12057-24-8, Lithium oxide, uses  
50926-11-9, Indium tin oxide 123847-85-8 146162-54-1  
RL: DEV (Device component use); USES (Uses)  
(optimization of driving lifetime durability in organic **LED**  
devices using **iridium** phenylpyridine complex and  
containing)

IT **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl  
RL: DEV (Device component use); USES (Uses)  
(optimization of driving lifetime durability in organic **LED**  
devices using **iridium** phenylpyridine complex in)

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L43 ANSWER 10 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2001:163834 HCAPLUS

DOCUMENT NUMBER: 135:172723

TITLE: Optimization of emitting efficiency in organic  
LED cells using Ir complex

AUTHOR(S): Watanabe, T.; Nakamura, K.; Kawami, S.; Fukuda,  
Y.; Tsuji, T.; Wakimoto, T.; Miyaguchi, S.;  
Yahiro, M.; Yang, M.-J.; Tsutsui, T.

CORPORATE SOURCE: Corporate R&D Laboratories, Pioneer Corporation,  
Tsurugashima, Saitama, Japan

SOURCE: Synthetic Metals (2001), 122(1), 203-207  
CODEN: SYMEDZ; ISSN: 0379-6779

PUBLISHER: Elsevier Science S.A.

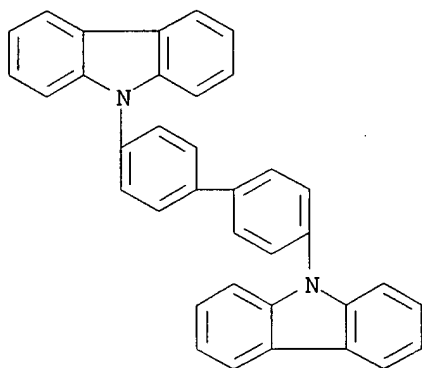
DOCUMENT TYPE: Journal

LANGUAGE: English

AB **Multilayer** organic **light-emitting** devices  
(**OLED**) with **phosphorescent** guest emitter,  
tris(2-phenylpyridine) Ir doped in a **host**  
4,4'-N,N'-dicarbazol-biphenyl layer, were prepared The authors  
optimized the cell structure paying special attention to the  
multiple reflection at the **multilayers'** interfaces and  
succeeded in improving the **luminance** efficiency. The  
authors' method consists of adjusting optical distances between  
emission sites and dominant reflective surfaces, organic/cathode and

ITO/glass interfaces. The device with the 8.7 weight % Guest emitter exhibited external quantum efficiency and power **luminous** efficiency of 14.9% and 43.4 lm/W, resp. at the **luminance** of 100 cd/m<sup>2</sup> driven at the voltage of 4.2 V In addition, the authors studied the emission site in the electrophosphorescent cells and recalcd. the external quantum efficiency by the actual emission pattern.

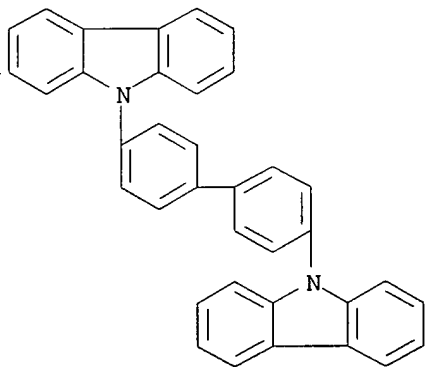
IT **58328-31-7**  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (optimization of emitting efficiency in organic **LED** cells  
 using Ir complex)  
 RN 58328-31-7 HCAPLUS  
 CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX  
 NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 ST optimization emission org LED **iridium** complex  
 IT **Electroluminescent** devices  
 Interference  
 Optimization  
**Phosphorescence**  
 (optimization of emitting efficiency in organic **LED** cells  
 using Ir complex)  
 IT 7429-90-5, Aluminum, uses 12057-24-8, Lithium oxide, uses  
 50926-11-9, Indium tin oxide  
 RL: DEV (Device component use); USES (Uses)  
 (optimization of emitting efficiency in organic **LED** cells  
 using Ir complex)  
 IT 94928-86-6, Tris(2-phenylpyridine) **iridium**  
 RL: DEV (Device component use); PEP (Physical, engineering or  
 chemical process); PRP (Properties); PROC (Process); USES (Uses)  
 (optimization of emitting efficiency in organic **LED** cells  
 using Ir complex)  
 IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 4733-39-5,  
 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline **58328-31-7**  
 123847-85-8, NPB  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (optimization of emitting efficiency in organic **LED** cells  
 using Ir complex)  
 REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE .RE FORMAT



L43 ANSWER 11 OF 11 HCAPLUS COPYRIGHT 2005 ACS on STN  
ACCESSION NUMBER: 2000:648118 HCAPLUS  
DOCUMENT NUMBER: 133:327530  
TITLE: High quantum efficiency in organic **light-emitting** devices with **iridium**-complex as a triplet emissive center  
AUTHOR(S): Tsutsui, Tetsuo; Yang, Moon-Jae; Yahiro, Masayuki; Nakamura, Kenji; Watanabe, Teruichi; Tsuji, Taishi; Fukuda, Yoshinori; Wakimoto, Takeo; Miyaguchi, Satoshi  
CORPORATE SOURCE: Department of Applied Science for Electronics and Materials, Graduate School of Engineering Sciences, Kyushu University, Fukuoka, 816-8580, Japan  
SOURCE: Japanese Journal of Applied Physics, Part 2: Letters (1999), 38(12B), L1502-L1504  
CODEN: JAPL D8; ISSN: 0021-4922  
PUBLISHER: Japan Society of Applied Physics  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB **Multilayer organic light-emitting** devices with **phosphorescent** guest emitter, tris(2-phenylpyridine) **iridium** doped in a **host** 4,4'-N,N'-dicarbazolbiphenyl layer were prepared. The device with the 6.5 wt% guest emitter exhibited external quantum efficiency and power **luminous** efficiency of 13.7% and 38.31 m/W, resp. at the **luminance** of 105 cd/m<sup>2</sup> driven at the voltage of 4.0 V and c.d. of 0.215 mA/cm<sup>2</sup>. The half decay lifetime under continuous constant-current driving for the initial **luminance** of 500 cd/m<sup>2</sup> was 170 h.  
IT **58328-31-7**, 4,4'-N,N'-Dicarbazolylbiphenyl  
RL: DEV (Device component use); USES (Uses)  
(charge carrier; high quantum efficiency of organic **light-emitting** devices containing tris(phenylpyridine) **iridium** as triplet emissive center)  
RN **58328-31-7** HCAPLUS  
CN 9H-Carbazole, 9,9'-[1,1'-biphenyl]-4,4'-diylbis- (9CI) (CA INDEX NAME)



CC 74-1 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
Section cross-reference(s): 76

ST org light emitting device phenylpyridine  
 iridium complex phosphorescence triplet; quantum  
 efficiency phosphorescent iridium complex org  
 light emitting device; LED quantum efficiency  
 phosphorescent iridium complex;  
 electroluminescent display LED quantum efficiency  
 phosphorescent iridium complex

IT Luminescence, electroluminescence  
 Triplet state excitation  
 (high quantum efficiency of LED containing  
 tris(phenylpyridine)iridium as phosphorescent  
 emissive center)

IT Phosphorescence  
 Triplet state transition  
 (high quantum efficiency of organic light-emitting  
 devices containing tris(phenylpyridine)iridium as triplet  
 emissive center)

IT Electroluminescent devices  
 (organic; high quantum efficiency of organic light-  
 emitting devices containing tris(phenylpyridine)  
 iridium as triplet emissive center)

IT Triplet state  
 Triplet state  
 (triplet-triplet energy transfer; high quantum efficiency of organic  
 light-emitting devices containing  
 tris(phenylpyridine)iridium as triplet emissive center)

IT Energy transfer  
 Energy transfer  
 (triplet-triplet; high quantum efficiency of organic light  
 -emitting devices containing tris(phenylpyridine)  
 iridium as triplet emissive center)

IT 50926-11-9, ITO  
 RL: DEV (Device component use); USES (Uses)  
 (anode; high quantum efficiency of organic light-  
 emitting devices containing tris(phenylpyridine)  
 iridium as triplet emissive center)

IT 12057-24-8, Lithium oxide, uses  
 RL: DEV (Device component use); USES (Uses)  
 (cathode material; high quantum efficiency of organic light  
 -emitting devices containing tris(phenylpyridine)  
 iridium as triplet emissive center)

IT 7429-90-5, Aluminum, uses  
 RL: DEV (Device component use); USES (Uses)  
 (cathode; high quantum efficiency of organic light-  
 emitting devices containing tris(phenylpyridine)  
 iridium as triplet emissive center)

IT 58328-31-7, 4,4'-N,N'-Dicarbazolylbiphenyl  
 RL: DEV (Device component use); USES (Uses)  
 (charge carrier; high quantum efficiency of organic light-  
 emitting devices containing tris(phenylpyridine)  
 iridium as triplet emissive center)

IT 2085-33-8, Tris-(8-hydroxyquinoline) aluminum  
 RL: DEV (Device component use); USES (Uses)  
 (electron transport agent; high quantum efficiency of organic  
 light-emitting devices containing  
 tris(phenylpyridine)iridium as triplet emissive center)

IT 4733-39-5, 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline  
 RL: DEV (Device component use); USES (Uses)  
 (electron transport/hole blocking layer; high quantum efficiency

of organic **light-emitting** devices containing  
tris(phenylpyridine)**iridium** as triplet emissive center)  
IT 123847-85-8,  $\alpha$ -NPD  
RL: DEV (Device component use); USES (Uses)  
(hole transport agent; high quantum efficiency of organic  
**light-emitting** devices containing  
tris(phenylpyridine)**iridium** as triplet emissive center)  
IT 94928-86-6  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(triplet emitter; high quantum efficiency of organic **light**  
**-emitting** devices containing tris(phenylpyridine)  
**iridium** as triplet emissive center)  
REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

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